

# **Correlative, Static and Dynamic Properties of Near-Critical Liquids in Small Volumes of Rectangular and Round Section**

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In the given paper we report the declination of the critical temperature, density, viscosity and susceptibility of the one-component near-critical liquid in small volumes of rectangular and round section, i.e. for bar and cylinder. The geometrical factor  $K$  which sets the degree of the spatial limitation is defined by  $K = q/Rco$ , where  $q$  is a characteristic size of a system. It was reduced to the order of 100 compared with the amplitude of the correlation length  $Rco$ . New values of critical parameters were defined by the maximum of the correlation length. Our results suggest that the critical singular behavior of the correlation length should remain only along the axis associated with the present geometry, i.e. in the spatially unlimited direction, and moreover not at the critical temperature of bulk liquid, but at the new one. Reduced geometry of a system leads to decreasing of the critical parameters like the critical temperature and density while the characteristic size of a system becomes smaller.

The important dynamic property of a liquid - the viscosity  $\eta$  - is determined from the corresponding scaling formula using the expression for the correlation length. Spatial limitation of a system makes the viscosity depending not only on thermodynamical variables but on the geometrical factor  $K$  as well. In contrast to a spatially infinite system for which the singular part of the viscosity demonstrates a "weak" anomalous growth at the bulk critical temperature, the maximum value of the viscosity in a finite-size liquid at the bulk criticality turns out to be finite and dependent on the characteristic size of a system as  $\eta \sim q^x$ , where  $x = 0.06$  is the universal exponent. Results which are obtained for the viscosity allow us to study the specific features of the critical behavior of the width of the central line in spectra of the light critical opalescence in finite-size liquids.

The conducted research led us to make the conclusion that reducing the volume's size leads to the decrease of the susceptibility after the decrease of the correlation length. However, its anomalous growth manifests at the new critical temperature which is the same one, as it was to be expected, which is calculated for the present geometrical conditions of spatial limitation of a system.